What is Claimed is:

[c1] 1.A method of assessing the cost tradeoffs associated with performing inspection, comprising:
determining measurement variations and product characteristic variations to define an inspection plane;
dividing the inspection plane into a plurality of regions corresponding to respective different outcomes resulting from an inspection process;
determining the probability of each outcome based on a probability mass in each region of the inspection plane, wherein the probability mass is based on a joint probability density of the measurement and product characteristic variations;
associating costs to various outcomes based on the inspection process; and computing overall costs of the inspection process by using the associated costs and the determined probability of each outcome based on the regions of the inspection plane.

[c2] 2.The method of claim 1, further comprising optimizing the computed overall costs by varying the costs associated with the various outcomes.

[c3] 3.The method of claim 1, further comprising optimizing the computed overall costs by varying the permissible product characteristic inspection limit.

[c4] 4.The method according to claim 1, further comprising optimizing the computed overall costs by using an inspection limit that is different from a permissible product specification limit.

[c5] 5.The method according to claim 4, wherein the step of dividing the inspection plane into the plurality of regions based on the different outcomes is performed using the inspection limit that is different from a permissible product specification limit.

[c6] 6.The method according to claim 3, wherein the inspection limit is narrower than a permissible product characteristic specification limit.

[c7] 7.The method according to claim 6, wherein the step of determining measurement variations and permissible product characteristic variations

comprises receiving input values for a process and measurement joint probability density function, a lower specification limit, an upper specification limit, a lower inspection limit, and an upper inspection limit.

[c8] 8.The method according to claim 1, wherein the step of determining the probability of each outcome comprises summing a joint probability density of the measurement variation and the product characteristic variation in each region.

[c9] 9.The method according to claim 8, wherein the probability density functions of the measurement variation and the product characteristic variation are normal distributions.

[c10] 10.The method according to claim 1, wherein the step of associating costs to various outcomes comprises associating unit costs to events of product inspection (CI), product scrapping or rework (CR), escaping defect (CE), and unnecessary rework (CR).

[c11] 11.The method according to claim 10, wherein the step of dividing the inspection plane into a plurality of regions comprises dividing the inspection plane into the following regions - product within its specification limit is accepted with probability p1, product outside its specification limit is rejection with probability p2, product within its specification limit is rejected with probability p3, and product outside its specification limit is accepted with probability p4.

[c12] 12.The method according to claim 11, wherein the step of computing overall costs comprises calculating unit costs for the events as follows - product inspection (1*CI), product scrap or rework ((p2+p3)* CR), escaping defect (p4*CE), and unnecessary rework (p3*CR).

[c13] 13.The method according to claim 1, further comprising performing a second inspection on all products rejected in a first inspection.

[c14] 14.The method according to claim 13, wherein the second inspection comprises altering the measurement variations from the first inspection.

[c15] 15.The method according to claim 14, wherein the second inspection comprises using a different product characteristic inspection limit from the first inspection.

[c16] 16A system for assessing the cost tradeoffs associated with performing inspections, comprising:
an input unit for receiving input measurement variations, product characteristics variations, and associated costs of various outcomes based on an inspection process; and
a computing unit connected to the input unit and configured to:
define an inspection plane based on the input measurement variations and the product characteristic variations;
divide the inspection plane into a plurality of regions corresponding to the respective different outcomes resulting from the inspection process;
determine the probability of each outcome based on the probability mass in each regions of the inspection plane, wherein the probability mass is determined based on the joint probability density of the measurement variation and the product characteristic variation in each region; and
computing overall costs of the inspection process by using the associated costs and the determined probability of each outcome based on the regions of the inspection plane.

[c17] 17.A computer readable data storage medium having program code recorded thereon for assessing the cost tradeoffs associated with performing inspections, the program code causing a computing system to perform steps comprising:
determining measurement variations and permissible product characteristic variations to define an inspection plane;
dividing the inspection plane into a plurality of regions corresponding to respective different outcomes resulting from an inspection process;
determining the probability of each outcome based on the probability mass in each region of the inspection plane, wherein the probability mass is determined based on the joint probability density of the measurement variation and the product characteristic variation in each region;
associating costs to various outcomes based on the inspection process; and
computing overall costs of the inspection process by using the associated costs

and the determined probability of each outcome based on the regions of the inspection plane.